

SECTION I—CLAIMS

Amendment to the Claims:

This listing of the claims will replace all prior versions and listings of claims in the application. Claims 30, 33-35, and 38-44 are amended herein. Claims 1-29 remain canceled herein without prejudice. No new claims are added.

Listing of Claims:

1-29. (Canceled)

30. (Currently amended) A method comprising:

receiving content for transmission from a wireless communication system having M transmit antennae and N receive antennae and N_c subcarriers, where $N_c \gg M, N$, the received content for transmission from a plurality of more than two of the M transmit antennae, wherein the received content is a vector of input symbols (s) of size $N_c \times 1$, and wherein the N_c subcarriers is the number of subcarriers of a the multicarrier wireless communication channel of the wireless communication system; and

generating a rate-one, space-frequency code matrix from the received content for transmission via the plurality of more than two of the M transmit antennae by dividing the vector of input symbols into a number G of groups to generate subgroups and multiplying at least a subset of the subgroups by a constellation rotation precoder to produce a number G of pre-coded vectors (v_g), wherein successive symbols from the same group transmitted from the same antenna are at a frequency distance that is multiples of MG subcarrier spacings, wherein M represents a number of transmit antennae.

31. (Previously Presented) A method according to claim 30, further comprising:

dividing each of the pre-coded vectors into a number of $LM \times I$ subvectors; and

creating an $M \times M$ diagonal matrix $D_{s_g,k} = \text{diag}\{\Theta_{M \times (k-1)I}^T \mathbf{s}_g, \dots, \Theta_{M \times kI}^T \mathbf{s}_g\}$, where $k=1 \dots L$ from the subvectors.

32. (Previously Presented) A method according to claim 31, further comprising:

interleaving the L submatrices from the G groups to generate an $M \times Nc$ space-frequency matrix.

33. (Currently amended) A method according to claim 32, wherein the space-frequency matrix provides MNL channel diversity, while preserving a code rate of 1 for any number of the transmit antennae M , receive antennae(s) N and channel tap(s) L .

34. (Currently amended) A method according to claim 30, wherein the space-frequency matrix provides MNL channel diversity, while preserving a code rate of 1 for any number of the transmit antennae M , receive antennae(s) N and channel tap(s) L .

35. (Currently amended) An apparatus comprising:

a diversity agent;

to receive content for transmission from a wireless communication system having M transmit antennae and N receive antennae and Nc subcarriers, where $Nc \gg M, N$, the received content for transmission via a multicarrier wireless communication channel of the wireless communication system, wherein the received content is a vector of input symbols (s) of size $Nc \times 1$, and wherein the Nc subcarriers is the number of subcarriers of the multicarrier wireless communication channel; [.] and

to generate a rate-one, space-frequency code matrix from the received content for transmission on the multicarrier wireless communication channel from a plurality

of more than two of the M transmit antennae by dividing the vector of input symbols into a number G of groups to generate subgroups and multiplying at least a subset of the subgroups by a constellation rotation precoder to produce a number G of pre-coded vectors (v_g), wherein successive symbols from the same group transmitted from the same antenna are at a frequency distance that is multiples of MG subcarrier spacings,

wherein M represents a number of transmit antennae.

36. (Previously Presented) An apparatus according to claim 35, the diversity agent further comprising:

a space-frequency encoding element, responsive to the pre-coder element, to divide each of the pre-coded vectors into a number of $LM \times I$ subvectors, and to create an $M \times M$ diagonal matrix $D_{s_g,k} = \text{diag}\{\Theta_{M \times (k-1)+1}^T s_g, \dots, \Theta_{M \times k}^T s_g\}$, where $k=1 \dots L$ from the subvectors.

37. (Previously Presented) An apparatus according to claim 36, wherein the space-frequency encoding element interleaves the L submatrices from the G groups to generate an $M \times Nc$ space-frequency matrix.

38. (Currently amended) An apparatus according to claim 37, wherein the space-frequency matrix provides MNL channel diversity, while preserving a code rate of 1 for any number of the transmit antennae M , receive antennae ~~antenna(s)~~ N and channel tap(s) L .

39. (Currently amended) An apparatus according to claim 35, wherein the space-frequency matrix provides MNL channel diversity, while preserving a code rate of 1 for any number of the transmit antennae M , receive ~~antennae~~ ~~antenna(s)~~ N and channel tap(s) L .

40. (Currently amended) A wireless communication system comprising:
a number M of omnidirectional antennas, wherein M comprises more than two omnidirectional

antennas;

a number N of receive antennae;

a number N_c of subcarriers of a multicarrier wireless communication channel of the wireless communication system, where $N_c \gg M, N$; and

a diversity agent; $[[\cdot]]$

to receive content for transmission via $[[a]]$ the multicarrier wireless communication

channel, wherein the received content is a vector of input symbols (\mathbf{s}) of size $N_c \times$

1, and

~~, wherein N_c is the number of subcarriers of the multicarrier wireless communication channel, and~~

to generate a rate-one, space-frequency code matrix from the received content for

transmission on the multicarrier wireless communication channel from at least a

subset of the M omnidirectional antennas by dividing the vector of input symbols

into a number G of groups to generate subgroups and multiplying at least a subset

of the subgroups by a constellation rotation precoder to produce a number G of

pre-coded vectors (\mathbf{v}_g), wherein successive symbols from the same group

transmitted from the same antenna are at a frequency distance that is multiples of

MG subcarrier spacings.

41. (Currently amended) A wireless communication system according to claim 40, the diversity agent further comprising:

a space-frequency encoding element, responsive to the pre-coder element, to divide each of the

pre-coded vectors into a number of $LM \times I$ subvectors, and to create an $M \times M$ diagonal

matrix $D_{\mathbf{s}_g, k} = \text{diag}\{\Theta_{M \times (k-1), 1}^T \mathbf{s}_g, \dots, \Theta_{M \times L}^T \mathbf{s}_g\}$, where $k=1 \dots L$ from the subvectors.

42. (Currently amended) A wireless communication system according to claim 41, wherein the space-frequency encoding element interleaves the L submatrices from the G groups to generate an $M \times Nc$ space-frequency matrix.
43. (Currently amended) A wireless communication system according to claim 42, wherein the space-frequency matrix provides MNL channel diversity, while preserving a code rate of 1 for any number of the omnidirectional antennas M , receive ~~antennae~~ antenna(s) N and channel tap(s) L .
44. (Currently amended) A wireless communication system according to claim 40, wherein the space-frequency matrix provides MNL channel diversity, while preserving a code rate of 1 for any number of the omnidirectional antennas M , receive ~~antennae~~ antenna(s) N and channel tap(s) L .